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ABSTRACT

Panelists and participants of the Global Summit on Distance Education addressed the roles of the private sector, governments and educational institutions in creating equitable and useful distance education services as telecommunication policies and rules are changing worldwide. This report provides an executive summary, summary of proceedings, and appendices including a summary of the roundtable discussion on global communications, the conference program, remarks by U.S. Senator Larry Pressler, press release for the conference, and questionnaire distributed to conference participants. Panel topics were: the role of the private sector; the role of government; education, training, and technology; new technology transfer and applications; distance education providers' experiences; educational and industry collaboration; and the impact of changing national and international policy. Participants agreed that distance education is in great demand worldwide, demand that is soaring as awareness grows of its potential for maximizing use of teaching resources to reach larger numbers of learners. It holds unrivaled promise for equalizing education for the remote, the isolated, and the disadvantaged, but it may not be available or affordable where it is needed most. It also challenges the future of educational bureaucracies and institutions trying to put it into practice. The private sector has proved its ability to offer distance education by adapting a variety of technologies for local needs, but satellites will be the future worldwide delivery mechanism of choice. (Author/SWC)

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Global Summit on Distance Education
Final Report

23-24 October 1996
Washington DC USA

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Global Summit On Distance Education Advisory Committee

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Honorable Conrad Burns

Honorable John D. Rockefeller IV

Honorable George E. Brown, Jr.

Honorable Constance A. Morella

George Washington University

International Medical Programs, Inc.

Oklahoma State University

Texas Tech University

University of South Dakota

University of Virginia Health Sciences Center

American Educational Research Association (AERA)

Society of Satellite Professionals International (SSPI)

THE VICE PRESIDENT
WASHINGTON

Dear Friends:

I would like to take this opportunity to welcome you to the Global Summit on Distance Education. The Summit represents a unique opportunity to bring together U.S. and global participants in distance education, and I welcome the initiative taken by its many commercial and educational sponsors.

President Clinton and I have been committed to promoting the growth and development of a Global Information Infrastructure. Composed of interconnected local, national, and regional networks, the GII has the potential to provide people around the world with the means and opportunities to participate fully in the Information Age. Such a global network will enable people to communicate across national boundaries and continental boundaries as easily as we communicate from city to city today. It will foster economic growth and trade, spread freedom and democracy, improve health care and education, and help protect the environment. The GII is about breaking the barriers that limit our knowledge of the world, our neighbors and ourselves.

A great number of academic studies show that the use of technology in support of education and instruction has led to higher achievement in language, art, math, social studies and science. The opportunities to harness distance education technologies for the advancement of health care, training for workers, accessibility for the disabled, and many other applications are limited only by our imagination.

The issues that you will be discussing are critical ones. How can the GII best serve the diverse needs of its users? What are the roles of the private sector and the government in the development of this global network of networks? How can the private sector make a profit while simultaneously bringing the benefits of the GII to every corner of the earth in an affordable and useful way? And how can governments protect the public interest values of democracy, education and economic and social well-being for all of our citizens while removing roadblocks to private investment and competition?

The President and I regret that we can not join you in person, but we look forward to learning the results of your work and deliberations. Please accept my best wishes for a successful meeting.

Sincerely,

Al Gore

Al Gore

Introduction

On October 23 and 24 1996, the Global Summit on Distance Education brought together over 300 government representatives, business executives, and educators from six continents to explore their roles in providing continuing opportunities for education and training, to help students and workers cope with demands in changing workplaces and culturally diverse societies. The Global Summit was held at the INTELSAT Building, 3400 International Drive NW Washington, DC, USA.

Panelists and participants addressed the roles of the private sector, governments and educational institutions in creating equitable and useful distance education services as telecommunication policies and rules are changing worldwide. (For a complete program listing see Appendix B.)

Attendees included policy makers from the education, business, medical, environmental, agricultural, and telecommunications communities, and represented countries and areas in North America, South America, the Caribbean, Pacific Rim, South Africa and the sub-Saharan region, and Europe.

Sponsors of the Global Summit on Distance Education included: Arel Communications & Software Ltd of Israel, Astrolink™ International, Ltd., AT&T SKYNET® Satellite Services, COMSAT World Systems, Inc., Hughes Communications, Inc., International Telecommunications Satellite Organization (INTELSAT), Mitchell Technical Institute/MTI Telcom Systems, National Education Telecommunications Organization & EDSAT Institute (NETO/EDSAT), National Technology Transfer Center - Washington Office, Telemation/Los Angeles, and Washington International Teleport (WIT).

A Global Summit on Distance Education Advisory Committee has served to guide planning for the gathering. Its members include: Honorable Larry Pressler, Honorable Conrad Burns, Honorable John D. Rockefeller IV, Honorable George E. Brown, Jr., Honorable Constance A. Morella, George Washington University, International Medical Programs, Inc., Oklahoma State University, Texas Tech University, University of South Dakota, University of Virginia Health Sciences Center, American Educational Research Association (AERA), Society of Satellite Professionals International (SSPI).

The following is a full report on the proceedings of the Global Summit on Distance Education.

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I. Executive Summary

Global Summit on Distance Education
23-24 October 1996, Washington DC USA

EXECUTIVE SUMMARY

SETTING: More than 300 educators, distance education theorists and practitioners from nearly 30 countries covering six continents gathered at INTELSAT headquarters in Washington Oct. 23-24, 1996, to debate ways to achieve better access for all to modern communications technology. The two-day session featured several prominent speakers and seven panel discussions.

Panel topics were: the role of the private sector; the role of government; education, training and technology; new technology transfer and applications; distance education providers' experiences; education and industry collaboration; and the impact of changing national and international policy.

FINDINGS: Participants agreed that *distance education is in great demand* worldwide, demand that is soaring as awareness grows of its potential for maximizing use of teaching resources to reach larger numbers of learners. *It holds unrivaled promise* for equalizing education for the remote, the isolated and the disadvantaged; but *it may not be available or affordable* where it is needed most. It also *challenges the future of educational bureaucracies and institutions* trying to put it into practice. The *private sector has proved its ability to offer distance education* by adapting a variety of technologies for local needs, but *satellites will be the future worldwide delivery mechanism of choice*.

CURRENT STATUS: Distance education techniques now in use range from very basic (one-to-one, one-way analog cable video and sound transmission) through state-of-the-art (one-to-many, two-way interactive multimedia digital fiber-optic and satellite service), and every combination in between. Content includes corporate and vocational education technical training, corporate internal communication and conferencing, engineering and other degree courses, language instruction, medical diagnostic and education services, and every kind of conventional school house offering.

PROBLEMS have included *suspicion and reluctance* by institutions and overworked, untrained teachers who must put the technology into actual use, as well as *competition and duplication* among content providers. Some small nations fear an overwhelming *flood of unwanted content* from the industrialized providers. The growth of distance education will make librarians and editors – knowledge navigators – more important, even as *the number of the nation's teachers is declining*. Distance education will bring *change in the very nature of universities and of teaching* itself. At every level, the *costs of access and equipment, and of training competent operators*, are a primary concern.

Costs of satellite time have skyrocketed recently as excess capacity, formerly donated or discounted, was used up. Providers see educators as customers like others who must pay the real costs of service plus the profit that allows providers to stay in business. Technology will balloon satellite capacity, but future satellites will not go up until that capacity is presold.

NEEDS: As technology evolves, *global standards* become more imperative so that new systems can be interoperable, enabling buyers to switch among suppliers and suppliers to compete with one another. The standards must involve all aspects of distance education: the information appliance (computer, screen, telephone); the human interface; the technical "transportation system" that carries the information; and the network of linked sites – information providers and recipients. The challenge is *to forge a flexible system that changes with technology and responds to market pressures, operating at rates that are affordable for educators but earn a reasonable profit for providers' shareholders.*

SOLUTIONS: The summit identified a number of strategies for lowering distance educators' satellite time costs under the current status quo:

- Use of lower-tech appropriate technology and/or Internet connections where feasible;
- Long-term purchasing commitments;
- Cooperative joint purchasing arrangements that speak with one voice so as to maximize buying power;
- Multiple end-use agreements to share costs and capacity wherever possible;
- Government subsidies;
- Socially responsible corporate policies;
- Charitable foundation involvement;
- Re-prioritizing to stress long-term investment; and
- Intensive, organized lobbying for laws, regulations and price breaks to benefit education.

CONCLUSIONS: Educators might do best with a public/private partnership arrangement for a satellite dedicated to education; the lives of children cannot be approached with a traditional business attitude.

US FCC Chairman Reed Hundt reflected participant views when he proposed the evident need for a universal pool of revenues that would finance distance education for all schools. Stuart E. Eizenstat, US Undersecretary of Commerce for International Trade, called universal access a basic principle for the US Global Information Infrastructure now under construction. "*The government role is to ensure that the GII eliminates distance as a barrier to education, and to make the U.S. a world leader in the business of education,*" he said.

II. Summary of Proceedings

Global Summit on Distance Education
SUMMARY OF PROCEEDINGS

Wednesday 23 October 1996

IRVING GOLDSTEIN
Director General and CEO, INTELSAT

Welcoming Remarks

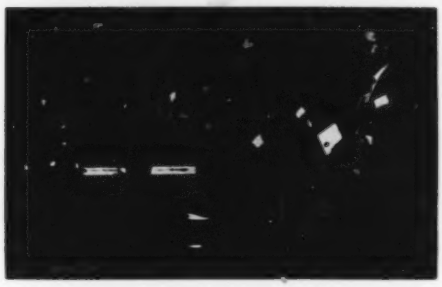
The key issue of the conference is how best to achieve better access for all to modern communications technology. This group of more than 300 people from nearly 30 countries covering six continents consists of education, government and industry representatives who provide and use distance education. Its importance was recognized by President Clinton and Vice President Al Gore, and a letter from the Vice President spotlighted our agenda questions: how can we reconcile the profit needs of business with the diverse and universal needs for service? What is the optimum government role?

PANEL: THE ROLE of the PRIVATE SECTOR in DISTANCE EDUCATION
HONORABLE JOHN H. BUCHANAN JR., Moderator

HONORABLE JOHN H. BUCHANAN JR.
Podesta Associates, US

Sen. Larry Pressler of South Dakota, unable to be present, wrote expressing confidence that distance education satellite connections will help link rural and urban areas. Education is crucial to achieving the full potential of our human resources.

JERALD F. FARRELL
President, Hughes Communications, US



The private sector has proved its ability to deliver education. We have the satellite capacity that can provide distance education if harnessed for it. The current point-to-point system is good, but satellites are going to be the delivery mechanism that will make distance education work. For example, a small town in California that cannot lure its own physics teacher will find a distance-education system using a faraway expert preferable to a part-time or liberal arts teacher from another school.

Many universities have already developed distance education programs. Some private firms use courses from Detroit and Japan for automotive training for US dealers and repair shops; legal, medical, fire and safety training are already prominent distance education courses.

Farrell was involved when IBM launched its first Interactive Satellite Education Network in 1984, using it to train corporations' computer people to use IBM systems. The method was welcomed by trainers as cutting their travel time, and 60 to 70 percent of the students preferred it to live training. Another project used a special elementary education curriculum to generate engineering students out of 40 schools, and worked so well that Viacom has taken it over and plans to expand it. Altogether Hughes has launched $1.5 billion worth of satellites while waiting for the government to get going.

HONORABLE TONY COELHO
Chairman and CEO
ETC w/tci (Washington/Tele-Communications Inc.), US

The magic of education is that it equalizes people, and the capability now exists to do this globally with distance education. It can also happen in a local school district, with transmissions from one teacher to many classrooms. McDonalds is using it to try to produce a french fry that tastes the same worldwide. Coelho's company is giving Spanish lessons by two teachers in Arizona to schools and homes nationwide. It enables on-the-job learning and lifelong learning.

BARRY INOUYE
Director, International Programs
CODETEL, Dominican Republic

CODETEL owns and operates a videoconference network that helps corporations conduct training, communicate internally and hold conferences. Although applications are limited at the moment, the firm is conducting a medical communications technology demonstration project linking doctors in the Dominican Republic with doctors giving seminars in a clinic in Cleveland. Feedback is very good so far. He has three concerns:

- *Prices are going up* as video-conferencing technology improves, not down as might have been expected;

- *Logistical* difficulties limit the number of videoconferencing sites so that travel to them can be bothersome and costly; and

- Site *marketability* is uneven as they are not always cost-effective.

Personal computer-based systems that use telephone lines would be more accessible, but their imaging capacity is limited. The whole idea has much potential but costs remain too high for large scale use. The best uses now are as part of a big-conference package sale; as a showcase; or for internal corporate communications. For social-impact use in less-developed countries, government grants would be required. PCs could be used if fine imaging is not necessary.

RENATO GOODFELLOW
HEAD OF SATELLITE SERVICES INITIATIVES
British TeleCom (BT), UK

BT uses distance connections for its own internal communications and for personnel training. The Summit meeting has already proved useful in triggering internal correspondence on possible other ways to use distance education.

ELLWOOD R. KERKESLAGER
Vice President, Technology and Infrastructure
AT&T, US

AT&T provides the content of distance education programs and also uses them to train its employees, using three percent of its education budget. Workers can move from a BA degree through a PhD in a completely successful and cost-effective program that is the wave of the future. He sees four imperatives for content providers.

- *They must understand the total distance education system* – both its technical and content sides—in order to meet the needs. The system involves an information appliance (computer, screen, telephone, whatever), the human interface, interoperability of the various options, and the network of linked sites. Interoperability of new systems will require global operating standards, and arriving at those will be a private sector responsibility.

- *They must protect their investment*, which requires long-range planning for future parts requirements and systems.

- *They must stay in business*: that is, make a profit.

- *They must provide vision* for flexibility and changing systems able to plug in new technology. This all but requires digital systems.

One transistor equaled one computer chip in 1949; now five million transistors equal one computer chip. This means location and distance are irrelevant. Costs are crashing for both satellite systems and fiber-optic systems as technology improves and competition grows, and meanwhile system capacities are exploding. For example, one fiber can now carry 20 gigabytes of data per second; at 384 kilobytes per channel, that's more than 52,000 channels per fiber, and we're running 144 pairs of fibers in each cable – 7.5 million channels. Yet the fiber technology has already been demonstrated in AT&T-Bell Labs that runs 1 terabyte (1 trillion bytes) per second through a fiber, for a possible cable load of 2.6 million channels.

The bad news in distance education is that it has become the monopoly of large institutions. Smaller operations that might want to get in on the business can't do it.

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DISCUSSION

How can rural and urban cost and access difficulties be solved?

Kerkeslager: Rural and distant content providers may have a long-term commitment to keep offering their product, but they may not be able to reach the US market. Less-developed nations and the very poor could be served from the US with an analog low-baud system; interactivity in rural US communities is already cost-effective. He works with more than 100 LDCs; the technology *can* be successfully adapted to most situations.

Coelho: Distance learning will make teachers more successful by giving them larger student bodies. It's a tremendous equalizer for the 49 million US citizens with disabilities, in particular, because it promotes use of their *abilities* to contribute. The technology costs are offset by savings on substitute teachers, busing, delays and other ways that feasibility studies can reveal.

Farrell: It's not a question of costs but of priorites. A capital investment of $50,000 will bring in the very best physics teacher, always available, where $25,000 will bring in whoever's around, a warm body to home-sit the room.

Inouye: What's required is a combination of government priority-setting and socially responsible policies and companies.

Who pays the costs of reception—medical courses, for example?

Farrell: Multichannel dishes can cost only $400, and getting programs on a higher frequency satellite system that allows splitting the download to many points can lower transmission prices.

Kerkeslager: Preventive care information can go out on the Internet that's already available in libraries, clubs, schools and other community centers with public access terminals. These can become community training centers. Cheap Internet access equipment will be on the market very soon.

Coelho: The law requires that cable TV companies make space available to public access; but of course the content has to be interesting enough to attract viewers. All these systems still do have to make a profit.

Goodfellow: In Europe, very few satellites are used for direct links, so spare channels are often available for temporary use in distance learning transmissions. These subchannel or teletext services are becoming a mass media solution, in fact.

The costs of reception and universal Internet access have been identified as key issues.

Farrell: Hughes Network Systems services are becoming available here with a direct PC connection: a $500 card enables a two-foot receive/transmit dish at any site to bring in video. It's limited bandwith (so downloading may be slow), but it is direct home Internet access.

Audience: The National Information Display Laboratory is showing a digital system to allow the direct broadcast of advertising to hundreds of thousands of consumers. It can carry any kind of data; the US government now uses it to send information back and forth on the UN forces in Bosnia, while the University of Nebraska is transmitting K-12 courses statewide.

Audience: Why not use satellites' vacant time in space in an organized way with nonprofit groups to produce real education instead of promoting global consumerism?

Farrell: Surplus capacity was supplied to educational users up to five years ago on a case-by-case basis, but the University of Virginia, for example, wants a guarantee that a particular time will be reliably available forever, and we can't do that. Surplus capacity that we used to donate has vanished with the recent non-replacement of satellites, so that the charges to you now reflect the real costs to us. The cost of transponders is high but hasn't changed. With digital, prices will drop, but first we have to invest in that technology.

Kerkeslager: Skynet satellite operation wasn't crucial to AT&T as it split up, so it was sold. Distance learning people have to remind providers they are customers for satellite time like all others, with similar planning needs that require flexibility. They must insist on standardization of equipment, that will allow them to pick and choose among suppliers, thereby stimulating competition. Also remember that communications costs are 7 to 15 percent of the distance learning cost; the actual appliance is the bulk of it. Think of the technology as multipurpose: one line can support foreign aid communications, telemedicine, education—function after function to become profitable and attractive to many different sources of financial support. Watch out for proliferation of bureacracies trying to control it, however.

Audience: Couldn't we get a preferential rate scale for sending medical training courses, for example, into poorer countries, on grounds business markets would open indirectly? It worked in Vietnam.

Inouye: Even at $3 per month in the Dominican Republic, only 10 percent of the population could afford it. We have few computer users but they are very intense, and when the right program is available, demand skyrockets, producing a balance.

Farrell: US rules now set aside four to seven percent of capacity for non-profit use. Direct broadcast channels are already available for education purposes in Latin America, although Chile and Venezuela don't seem to want each other's programming at this point.

HONORABLE GEORGE E. BROWN JR.
US House of Representatives
REMARKS BY SATELLITE

Technical problems have been replaced by issues of financing and content – political issues that have arisen faster than the national will to take advantage of the machinery. The need is to provide US children and the rest of the world with education, and he hopes government will provide more financial help.

PANEL: THE ROLE OF GOVERNMENT IN DISTANCE EDUCATION
HONORABLE JOHN H. BUCHANAN, Moderator

AMBASSADOR STUART E. EIZENSTAT
Undersecretary of Commerce for International Trade
Department of Commerce, US

Building the National and Global Information Infrastructure (NII and GII) is a high Clinton administration priority. Both will be based on five principles: cooperation, private investment, open access, regulatory flexibility and universal service. Broad US and international support will produce a February 1997 agreement on liberalizing the World Trade Organization rules on information services. Other countries will be expected to match our degree of openness to ensure that the world is not further divided into information haves and have-nots.

The Telecommunications Act of 1996 recognized the need for discounted education rates for Internet access at US libraries and K-12 schools; a joint board is now developing the rules. The president wants the FCC to require a free basic rate and deep discounts for other services (including wiring and international networking), based on a plan that is flexible, market-based and neutral on technology choice. Universal access is critical for the information needs of the 21st century; the government role is to ensure that the GII eliminates distance as a barrier to education and to make the US a world leader in the business of education.

PETER McMECHAN
Director, Commonwealth of Learning
Vancouver BC, Canada

An expert group surveyed distance education as a possible solution to the problems of education among the British Commonwealth's 53 nations that have 25 percent of the world population. Only four are developed; half are very small and the rest (India, Pakistan etc.) are large but poor. Three concerns emerged:

- *Developing institutions* to use the technology effectively may be the hardest part, involving change of habitual thinking.
- *Cooperation vs. sales* of education as a commodity mean converting student exchange programs, for example, into distance-education exchange transmissions.
- Finding the *lowest-level solutions* that will work may broaden the have/have-not gap: computer hardware may be available but an area without electricity can't use it, as in the Gilbert Islands, for example. The government role must be to create the climate where private investment can make distance education happen.

JOSEPH D. RODOTA JR.
Deputy Chief of Staff
Office of Gov. Pete Wilson of California, US

Content will rule the world distance education market and California will be an aggressive competitor. When western governors proposed a distance education link to offer courses to the region as a Western Governors University, California declined: it has 1.8 million students to the rest of the region's 1.4 million, and its teaching quality, language diversity and cooperative resources are the best. It is setting up its own California Virtual University.

This will be the sum of all the existing California universities in its course offerings that may eventually go to another 400,000 students. The governor is developing a package of tax laws, establishing catalogue links and coordinating investments in marketing and trade missions to produce a very favorable business climate for investments and foundations. Some day anybody will be able to take any course anywhere, in any language.

LUIS SANZGADEA
Senior Officer
Ministry of Development, Spain

Six government agencies are now coordinating an experimental distance education project in Spain. It involves educators, telephones, satellites, ground links, teaching materials and end users together, and is aimed at giving all Spain's telecommunications engineering students a common education. A master classroom has been linked to eight distant classrooms via two-way audio and video, scanning devices, "blackboard" technology and so on, all of it digital.

Students have so far attended 5,000 student-hours of these classes and 85 to 90 percent say they are satisfied, rating them 4.5 on a scale of 5.0, compared to 4.1 for personal-presence classes. Teachers like it too as it frees them from traveling among the schools. The European Community named this the best continental education project of 1994.

BARRY EPSTEIN
Science, Technology and Competitiveness Fellow
Office of Sen. Jay Rockefeller IV of West Virginia, US

West Virginia is already wired under a multi-year, multi-million-dollar program to bring computers to every school. Political promises of a chicken in every pot have been replaced by promises that all services will be affordable; Telecommunications Act provisions Senator Rockefeller supported at least guarantee at a minimum, Internet access for schools and libraries – and, in the future, for medical facilities.

Educators may have to learn cooperation on a larger scale to become a market force strong enough to drive satellite costs down. But access is less an issue now than content, as it is on the Internet: can teachers be enabled somehow to know what is available, where it is, how good it is and how to retrieve it? Industry, government and educators must cooperate to solve this one at the grass-roots level.

DISCUSSION:

Is California willing to cooperate at the grassroots level?

Rodota: The Western Governors' proposal was not grassroots-oriented. California's plan will muster its creative film community to develop a stimulating product for students; and it will be market-oriented for greater benefit.

Can US/western technology, languages and thinking be translated successfully for other countries?

McMechan, Rodota: The French commonwealth offers a primary/secondary-school distance education program out of Bordeaux that is better funded than the British one, and also teaches French teachers. Mexican campuses are happily taking some courses in Spanish from science instructors in Florida.

Audience *(cranking a wind-up radio)*: some lesser technologies may work far better in some very poor places than satellites and computers. Beaming in world-class teachers in other places might foster contempt for local teachers and humiliate them into quitting, a disaster.

McMechan: Don't generalize that argument: students in Tonga taking a distance-education course from the University of New Delhi wanted to send the instructors e-mail but the system didn't allow it. Zambia was wired very early for e-mail.

Audience: Governments worldwide are looking for leadership and information that's not forthcoming now from the US. This Summit could begin to organize to provide it.

Epstein: Yes. US leadership in promoting distance education could not only be a foreign policy initiative that helps millions—in the former Soviet states, for example—but would create trade and jobs at home and overseas—a more powerful argument.

Sanzgadea: Private companies have taken over the Spanish government program and are expanding their service agreements with island nations and Latin American countries. The next step will be to offer it to all countries where demand for Spanish-language programming exists.

Audience: The Hispanic Telecommunications Network already has a cable system running and has secured INTELSAT capacity to offer its programs from Alaska through Argentina. These include programs on Machu Picchu in Peru and on Mexican pyramids for US students, and US programs for Latin students. Three universities in Colombia, a number of Mexican institutions and the commercial sector are hooking up. The project is funded by leasing air time to private firms; the government role should be to facilitate the work of companies like ours, and to keep smaller end users (like the Spanish-speaking population) on its radar screen.

Those of us from small nations worry that the "Information Superhighway" is a one-way street that will carry a flood of data from the rich giants outward, whether or not it is relevant to us.

With this flood, "knowledge navigators" – librarians and editors -- will become increasingly important and need to be strengthened in their ability to provide help and useful content. The International Federation of Library Associates could usefully hear much more about all these areas

We see countervailing trends separating the market requirements of business and for-profit companies from the need to reach the poor worldwide. If the poor cannot look to their governments for information services, can we ask market research people and organizations to keep in mind the *incremental* markets? Surely there are ways to expand profitable businesses marginally to serve more people in the interest of social responsibility.

LUNCHEON SPEAKER

HONORABLE REED E. HUNDT
Chairman
Federal Communications Commission, US

If at first the Telecommunications Act seems to be chiefly a lawyers' full employment measure, it will eventually create a level playing field for all. Distance education will be one of the best aspects of the telecommunications revolution, creating a revolution in education for worldwide benefit.

On a recent trip to China to promote a reliable set of laws to further open markets to US business, Hundt found great interest in the new law's interconnection order (now under US court appeal). The Chinese also think distance education may solve their literacy problem. They claim 75 percent literacy, but that still leaves 400 million who can't read, a colossal dilemma. Half of those people are constantly on the move, seeking work; the strain on the Chinese transport system is such that on a recent holiday the government banned people from visiting their parents.

Satellite and distance education is the logical and cost-effective solution for China's shortage of teachers, materials, infrastructure and just about everything education needs. Such a marriage between social value and business opportunity is the shape of the future.

Hundt is proposing an FCC education task force to deal with distance education issues. In Texas, for example, regional purchases of textbooks provide some general structure, although localities retain control of their curricula. A set of FCC rules would similarly require universal access to whatever distance education is available and let localities choose from the menu.

Educators are eager for this, but they worry about the price. A principal told Hundt his library takes all his discretionary funds now, so he would have to choose between that and distance ed. But a universal service pool of revenues to which all would contribute could allow the nation's schools to buy the distance ed technology they need—for all 110,000 schools and 2 million classrooms. It would be competitively neutral, allowing either a local preference or (his favorite) a business-neutral selection promoting competition—maybe even satellite-wireless competition. Hundt was told that where wiring would cost $10 billion, satellite links would be a tenth of that; although he's not asking for it, a couple of aircraft carriers might be given up to pay for this nationwide. The FCC votes Nov. 7 on the recommendations of a joint board and will issue its rules later. It's painful to think that China might organize a satellite system and educate 400 million people while the FCC might not pass the right rule to achieve much the same thing.

As we fail to act, kids keep growing up and passing through the system. A Harvard study of a fourth grade class recently concluded that with distance learning, all the good things go up—attendance, grades, participation—and the bad things go down, like boredom. But those target kids go on to other grades without distance ed. In some places, the Internet connection is a telephone in the principal's office, where few dare to tread. Meanwhile, the Defense Department runs an education system for military dependent children that is nowhere considered first-class, but now kids use the Army's satellite links to take, say, physics from a top-rated teacher in Germany.

If the FCC writes the right rules, the US vision of an educated world will sweep the planet. The economics work and the appeal of it is irresistible: literacy goes up, school interrelationships and sister-school arrangements increase, connecting US and Chinese students, for example. World experts will teach every child on the globe. Costs will plummet and benefits skyrocket. Let's do it.

PANEL: EDUCATION, TRAINING AND TECHNOLOGY
JAY SANDERS, MD, Moderator

SMITH HOLT
Dean, College of Arts and Sciences
Oklahoma State University, US

Contrary to what we have been hearing here, the government does not have at hand the immediate solution to our education needs, and action is urgently required. Program content is key: the old "Sunrise Semester" TV show would bore the current generation. In Alaska, the voters in a fund crunch chose to junk the education transponder and keep the entertainment one.

OSU's effort began in the early '80s and has grown exponentially to offer course work to 1,000 schools this year. A million kids have taken something. At its peak it was a $3 million to $4 million annual program. It began with campus-to-campus sharing, but turf issues arose immediately (like the California-Western Governors business) as well as who paid for what costs. Another question was how to charge non-traditional students who were not on campus.

Industry and military sites are easier—they're willing to pay for continuing education. But public schools are cost-sensitive. If ordered by the state budget-writers to buy something, they will, but many will not otherwise. They have low margins and plow their receipts back into their programs. For every 1,000-pound California gorilla there are a thousand 100-pound chimps. It's not reasonable to think all schools will buy their content from California because quality issues are secondary in priority to local contact with teachers, particularly at the high school level.

JOSE CONRADO BENITEZ
President
The Philippine Women's University, the Philippines

The issue, like an elephant, must be broken into bite-size pieces in order to be consumed. It's also like a sand castle that washes away just when you think you're done with it. The Philippines spends 47 percent of its budget on education and wants distance education because it's an island nation. But no individual school can produce the needed infrastructure for a satellite service, and the technology changes so fast that purchased programs are outdated before they can be used.

Our nation instead focuses on areas it *can* deal with: course structure and content. Educators are adapting thousands of hours of existing videotapes to use in local settings. They rule on multiple use proposals, credit or non-credit course offerings, retraining module proposals and continuing education ideas. They try to make the existing system do triple duty.

MARY HATWOOD FUTRELL
President, Education International, Belgium; and
Dean, School of Education and Human Development
George Washington University, US

Technical change is outpacing and driving change in the substance of education. Workplace needs now require lifelong learners, but two-thirds of America's three million teachers will abandon education in the next ten years. Resource-poor districts need help. What is the role of government and business in promoting equity and in countering critics of technical advances?

The problems start with access. Networks are usually centered in the library and all classrooms are not connected. Teachers may not even have blackboards and chalk; they need training in order to understand the new systems and incorporate them into teaching. There's a global movement toward education reform, but the classroom needs are for the technology, the resources to put in the wiring and the structure to make it work, and the teacher training to get it used.

ALLEN LEE SESSOMS
President
Queens College, New York, US

Queens College has 18,000 students, mostly provincial New Yorkers, half of whom have never been to Manhattan. They have no sense that they are "North Americans" sharing anything with Canada or Mexico. Queens, working with an IBM consortium, set up the North Atlantic Academic Forum that by the end of October will offer joint courses on the three nations using joint approaches and faculty. Six colleges in Mexico, three in the US and two in Canada are taking part, sharing information and "chat rooms" on the World Wide Web to create a broader experience of the world the students would not otherwise have. It will be content-driven, as students will be bored and teachers will drop out otherwise.

MENAHEM YAARI
President
Open University of Israel

Distance education is all we do. It's for soldiers and for our scattered settlements, neutralizing constraints of time and place. We are concerned with message and didactic utility, but we do use Internet and Intranet, multimedia and so on. Lifelong learning ("L-3") is the trend and the goal, according to a British report; most people need education at different times. For example, if government offers 15 years of free education, you might choose to take five of them at age 50, after the kids leave home. Distance education crosses borders and lines of conflict as well as schoolyard fences, divorcing the delivery of expert teaching from the teacher's location.

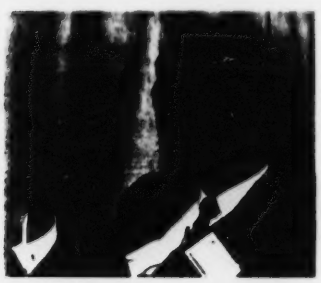
DISCUSSION

What are ways to get the faculty involved in providing content?

Holt: Departments don't normally support or reward innovative ideas, so strong administrative backing is crucial in finding resources and offering training. Once you convert the teachers, they proselytize for you. They like having kids ask for their autograph; they like being on camera. It changes all their options.

Futrell: We gave every faculty member a computer so they can all access e-mail, the library and the Internet at will. A master's level degree program is available through the system to all, and the student-teacher program is fully involved. We are coordinating with the schools of business and medicine to offer courses to other US campuses and other universities, stressing that the teachers' impact will be that much greater.

Sessoms: We bribe them. We set up faculty trips to cooperating university sites in Mexico and China, for example. Students also tend to punish teachers who are not computer literate. We've had no major resistance, but those who do resist we leave alone.



Benitez: We created special offices and modules, but we also made it clear that where the edict was *publish or perish*, now it's *be on line or face decline*.

Are there problems with the Philippines' Mabuhai satellite?

Benitez: Three satellites are going up, of which two will be dedicated to education. The problem is less one of technology than of content and of building the institutional infrastructure to use the satellite capacity effectively.

Discuss the needs of primary and secondary distance education versus university needs.

Holt: K-12 users are rightly skeptical about what university-level users say. His K-12 system had 14 users the first year, 50 the second year; it's like selling Bibles door-to-door. Local governance makes school boards conservative because they lose their jobs if they choose wrongly. The MTV generation requires interesting, high-quality programming in order to be interested.

Futrell: Support must be constructed in the community as well as in the schools. Teachers must be persuaded of its value, not kids—they are already familiar with computers. The schools also have to be restructured into longer classroom sessions in order to make the best use of it. Virginia, for example, is moving fast to wire its classrooms, create media centers, provide training, etc., even though it's a conservative state.

Sessoms: Generating community interest is easy; but partnerships need to join libraries, volunteer techies and teachers to get the system wired to suit local needs.

Audience: In Senegal and other African nations, distance education could solve the lack of teachers, medical training and many other problems in rural areas. Won't economy of scale make satellite technology accessible cheaply?

Benitez: No. The costs of transmission may be small but receiver charges may be big, and a $300 box may still cost too much for some places. Government requirements may be the only answer.

Futrell: Less-developed countries must be kept on the agenda when these discussions arise. We should advocate, for example, that the IMF and the World Bank require a *leveling-up* of education as part of all their structural adjustment programs, rather than allowing borrower governments to destroy their social safety nets in the name of austerity. But distance education can't be defined as a hundred students in a classroom with a machine; it must be promoted as one tool an effective teacher can use in working with students personally.

Holt and Yaari: OSU is working with UNESCO to put distance education programs into place in the former Soviet states. Israel's Open University is constructing programs for Africa on management and medical training.

Sessoms: Students and teachers should all see distance education as a tool for their own use.

Sanders: In five years, issues of cost, bandwidth and availability will be academic. Commerce, banking and entertainment are driving telecommunications expansion and we in the education industry will piggyback on them at an economical rate. For example, Hughes Communications will begin in 1997 to deploy 27 satellites to "footprint" the world, providing vast bandwidth capacity. Low Earth Orbiters (LEOs) are coming soon, platforms at 70,000 feet to hold all the necessary communications gear. And AT&T is laying cable all around Africa to provide access to bandwidth there.

Still, the technology has to be driven by the end users' needs to survive, and the actual need may be less than the perceived need. For example, current technology allows any medical patient to be examined by any doctor in a state. But when actual audiovisual consultations were analyzed, it was clear that most of them could have been handled by telephone. Asked why they used the video, doctors said they liked interacting socially as well as medically. Psychological needs like this may be important, but they might not be essential.

At the recent industrialized nations' Group of Seven meeting in South Africa, Sanders and the FCC's Hundt tried to convey the message that if the 41 less developed countries observing there created a regulatory and legal structure that welcomed G-7 capital, distance education would happen for them. It is of course ironic that the US hasn't done it either.

PANEL: NEW TECHNOLOGIES WORKSHOP—TRANSFERS AND APPLICATIONS
JOHN STEVENSON, Presiding

JOHN STEVENSON
Manager
Communications Engineering Support and R&D Group
INTELSAT, US

Engineers are a bit on the defensive at this point in our Summit. Evidently we have created too much that's too good too soon.

ZVIKA KLIER
General Manager
Arel Communications and Software Ltd., Israel

Arel has distance education systems in five nations. The issues are not so much content as the way the teacher uses and controls the technology so as best to interact with the students. Technology can't replace the teacher but can create an environment that allows this effective interaction between remote locations. Our software allows a teacher to instruct from a studio equipped like a super classroom. Each student watching on a TV screen has a phone-like handset, and the teacher has a screen that shows who is sitting where. Touching the screen creates a voice/video connection; if the teacher asks a question, the various responses can be tracked and compiled to show on the screen.

The teacher-student combination is the customer. The technology must: be easy to learn and operate; adapt to newer technology with new software later; use off-the-shelf components like telephones and PCs that can be repaired and replaced locally; and be flexible enough to connect at home, school, office, etc. Satellites are the preferred transmission method, as it's relatively easy to put a dish on a roof anywhere and solve the infrastructure problem. But cable, ground lines etc. are also used. Telephones link them to the PCs. So far university employees and corporations have been the customers; grade-school demand is less, perhaps because those teachers are less technically trained.

GUY HAMMER
Director
Office of Technical Applications
Ballistic Missile Defense Organization
Department of Defense, US

My office brings Defense Department technology to commercial applications. We identify the needs of the business education community and help lower their costs. Our ten years have a modest but very successful track record: we've equipped distance learning transmissions with captioning capacity for the hearing disabled and with video descriptions for the blind; our Missiles to Mammograms program transmits high-content mammogram data sets over long distances for diagnosis, and stores them too. We're working on composite material technology to reduce the weight of satellites, and on propulsion technology for their launch; we have a laser communications system demonstration project to test line-of-sight optical transmission of data.

MICHAEL R. KEROUAC
Senior Vice President
Multimedia Medical Systems, US

Our work educating medical personnal in less-developed countries or in isolated places like the Aleutian Islands has produced methods applicable to general education. Distance *teaching* is one thing; distance *learning* is another, and sick students can't learn. They have to be fed and feeling okay. School systems sick for lack of money can't do innovative work either.

One key is looking at triple-use cost accounting that merges public health needs with existing infrastructure and delivery systems. Eye and ear exams, vaccination campaigns and psychological

counseling, for example, are already offered in schools using a single staff and the building infrastructure; the same can be done with distance education. Where you as system administrators have constituents (bosses) and customers (students) as we do, we all have to generate multiple uses that benefit additional segments of society.

Partnerships with industries can help bridge gaps among the various special interest groups in your communities. Such intra-networking requires both the air-to-ground people and the ground-ground links to cooperate—for example, in creative capital investments and in designing multiple-use programs. In Alaska, Air Force programs teach specific job skills but also allow remote medical diagnosis, teacher and doctor training and local education courses. In North Carolina, schools joined hospitals and the court system in an experimental ATM (non-satellite) network. It lets a panel of judges convene wherever they are, links hospitals to outlying clinics, and offers distance education to everybody.

Stevenson: INTELSAT has demonstrations on end-end applications, linking medical diagnostic capacity and tuition capability in one software package, for example.

Kerouac: Follow-up is needed to convert demonstration projects into ongoing social service delivery programs.

Audience: The North Carolina project has one big obstacle, the $80,000 cost per download site. Telephone lines may be cheap but administrative charges and the two-way interactive charges balloon the prices, Information Superhighway rhetoric notwithstanding.

Stevenson: It's true that telecommunication companies are resource hungry and expect a high rate of return on their international transmissions. That's why you need to set up *user cooperatives* to share the download costs and set up end-to-end sharing and multiple usage. The capacity for that is online at INTELSAT as of last week!

Hammer: Intensive dialogue can shorten the time lag between feasibility and actual usage.

Audience: . Our managed care network set up remote diagnosis for prison systems, but RFPs to satellite providers now bring in bids that are 25 to 30 percent higher every year. Even sharing among multiple users is hard if costs are so unpredictable. We are a business too, not a philanthropy, and trying to link up with sellers of this technology is trying to hit a moving target.

The University of the South Pacific involves 12 countries, each with a satellite center. They were linked under demonstration projects but the links collapsed with rising rates. Now the shift to digital may enable reconnection as user numbers rise and capacity increases. Working together IS the answer, although cable and wireless still provide the connections for five nations.

JOHN A. CHAMPAGNE
Director
Ofice of Broadcast Systems
COMSAT-RSI, US

The Virginia distance education network is an example of adapting technology to the real world. With a rugged terrain and spread-out targets lacking land links, Virginia has been using fiber-optics, microwave and satellites in combination for years. It offers MBAs and baccalaureate degrees in graduate engineering plus secondary courses, going from zero students in 1984 to between 7,000 and 8,000 student-hours per year now.

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The program was stable until 1996, when satellite charges went up. Virginia put out an RFP to lease its uplinks and downlinks, and COMSAT won the bid, setting up the Digital Distance Education Network. It involves three new uplinks controlled from COMSAT's Maryland offices, carrying eight channels if they want them. It's configured to be teacher-friendly and has interoperability with international systems. COMSAT trains the site facilitator, who is usually the school librarian. The Virginia medical system is now also linked to 50 different sites. Lesson: Virginia got a good price because it committed to buying 30,000 hours of satellite time over the next three years, and pays "by the drink."

COMSAT can offer various compression technologies and tells the customers which is right for them. It may recommend fiber-optics, microwaves, ISDN or even copper if it makes sense. Virginia high schools, for example, are stuck with analog technology because they were able to sublease satellite time at $250 an hour, cheaper than converting to a digital system. Satellites are not always the right answer.

An ATM network Virginia is building might work if it can get into the mountain areas, although it might raise rates after awhile. That depends on the numbers of connections and the hours connected. Ten hours a month won't make it viable.

Stevenson: ATM *can* use satellites too. But corporations tend to use ATM when they want to connect closely located sites—Chrysler linking all its facilities in Detroit, for example.

BARRY H. WHALEN
Consultant
National Technology Transfer Center, US

The new Telecommunications Act and new FCC rules will directly expand services and lower costs worldwide. The personal computer revolution is very broad-based. The same technology is used in satellites, so the only problem is to get it into the education system.

But the telecomm industry is risk-averse. If the distance education community applies pressure and makes it clear it's not just along for the ride, the industry will move. You need to muster the facts: K-12 is a $150 *billion* business; although that is smaller than gambling and illegal drugs, it is still very large. **If you speak with one voice on what you need and what you will pay for it, you can take advantage of the telecommunications law and force the industry to compete for your business, driving costs down.** Future options have to be real, however, so as to generate competition. You must have vision yourselves to drive the creation of those options.

Government can help by subsidizing pilot programs and by lowering the investment and tax risks for private efforts. More technology is in the pipeline: the Defense Department has always subsidized the compression techniques that produced those impressive AT&T numbers; coming soon are high-performance, cheap digital projectors, disk players, interfaces—cable, fiber optic and satellite ready. Prices can and will drop *if* you force the industry to come in quickly and compete.

DISCUSSION

Industries are telling Oregon it needs an extensive fiber-optic communications system in order to attract their investment.

All panelists: Leave technical decisions to the technical people. Find out the industries' communications goals and let your technicians advise you and them on how best to get there. The melange effect means a combination of systems may be the best and cheapest way to meet current and future needs. Few applications really require high-quality two-way videoconferencing; on the other hand, surgeons may yearn eventually for three-dimensional links and we may be offering personal satellites. The end user does not need to know—and may never know—what kind of technology is being used to meet a certain standard. This is what interoperability means—that you can set your requirements and suppliers will compete in offering you various paths to it.

Global Summit on Distance Education
SUMMARY OF PROCEEDINGS

Thursday 24 October 1996

SHELLY WEINSTEIN
President and CEO
National Education Telecommunications Organization
and The EDSAT Institute (NETO/EDSAT), US

Opening Remarks

After 20 years of piggybacking on business and industry, the distance education market is still in the "occasional users" pigeonhole, even though in the aggregate, it is as big as the business market. Without close cooperation between business and education, government will be slow to assume its natural leadership role in this area.

The thread of yesterday's discussions was that global demand for distance education is strong and continuing to grow. Education now depends on geography and wealth, but the NETO vision is one of schools and individuals surfing through a wealth of education channels. Students everywhere need curriculum, instruction and training—live or delayed or virtual. The ideal is of a school that has multiple teaching and learning activities going on at the same time, at any hour and at any location. The reality is access to one hour of video or one live interactive program, one hour a day or week or month. Teachers and students can have multiple choices and curricula by tapping into the existing technology; Vice President Al Gore reminded us in 1994 that technology could bring the world together to produce economic progress, democracy, environmental improvement, health care and a shared sense of stewardship for our small planet. But this must be a democratic effort.

We now see the need to build an interconnected on-the-ground infrastructure in cost-effective ways. The needs of education are driving our children's future and with that infrastructure we could provide them access to the necessary training. We know what access to worldwide news has meant; worldwide education will change the planet far more, and for the better.

PANEL: THE EXPERIENCE OF DISTANCE EDUCATION PROVIDERS
CYNTHIA BOEKE, Moderator

BRIAN L. TALBOTT
Superintendent
Educational Service District 101
Washington, US

STEP/Star, a distance education network initially directed at small rural schools in Washington state, now serves 15,000 students in 32 states: 451 school districts and 2,041 locations across the US and the Pacific—one of the major distance education providers. He's often asked whether the market drives the technology or vice versa, and as an academic he says *Who cares?* As a practitioner he cares only to make classroom education better. That means parents and students will drive both the market *and* the technology.

The real issue is one of equity in access, because otherwise we will create a new generation of haves and have-nots. We must act quickly. The costs of transponders keep going up while other technology prices are coming down. STEP/Star is lucky in having a cooperative arrangement with a Northwest sports broadcasting company that went to 24-hour service, but it is only for one year. Afterward the reality is that suppliers make no distinction in pricing between prime and nonprime hours, between C and Ku bands or anything else. The strongest alliance to solve this would be a public-private partnership, but the government is sure to get involved because of the equity issue if we don't resolve it now, and the whole problem will end up in the courts. We'd better figure it out ourselves in order not to have a solution forced upon us.

ALI EKREM OZKUL
Assistant Dean
Open Education Faculty
Anadolu University, Turkey

Our state-controlled education system has increased secondary school enrollment by 75 percent, but we don't have facilities to meet the demand for higher education. 1.35 million students took the entrance exams last year for 200,000 university slots. The distance ed program was set up in 1984 to tackle this problem. It offers courses toward a BA in business and economics, and associate degrees of vocational training in 16 fields.

Our students live in 10 Western European countries. They get video broadcasts on a dedicated channel of government-run educational television. In Turkey, students meet in classrooms at educational centers in each of our 16 provinces. Local faculty teaches the courses and the centers give examinations three times a year. This is problematic; with 1,300 teachers, it's hard to set uniform standards. We're using audio conferencing and moving to videoconferencing and computer-based conferencing to increase that crucial student-teacher interaction on our distance ed programs. We want to increase our interaction with US, North African and European universities; Turkic countries emerging from the former Soviet Union in Asia are already requesting distance education materials from us. The International Space University is also talking to us.

Distance eduation already involves half the higher education students in Turkey. We would like to run a satellite-based system and to explore a pilot partnership project with INTELSAT as soon as possible.

ETIENNE BARANSHAJME
World Bank
African Virtual University Project
Sub-Saharan Africa

Twenty countries are collaborating to make the AVU an international success both in operations and administration. The AVU was conceived as a way to cut costs for various education providers. The

courses and the capacity both exist so far, so the issue is how to give higher education to high school graduates and help those who did not graduate. We knew individual providers would not go into the small markets, so we united to offer them a larger market. A five-part team of consultants from several nations designed it for Francophone and Anglophone areas both.

As US institutions already have courses and written material, we are customizing them with African examples that take the background of our students into account. Sometimes we design our own from scratch, and for French-language materials we have to do everything as what they send is not suitable. We want the students and the academics involved in that process to see it as training in solving problems—to learn that distance education can be valuable to them. The liberal arts and engineering are the basic US offerings now, and we need to unify them.

Our two-semester prototype program will begin next year with a basic science-engineering curriculum. We want to teach first the idea that science business can begin in a garage, like your Mr. Jobs, and that big startup money is not needed. At the end we hope to have a viable public/private partnership. Our questions now include the problems of expanding the network to reach remote areas and how we will generate the funding for that.

JOHN H. MATTINGLY
Vice President and General Manager
COMSAT World Systems, US

An African Virtual Bank is under development as a prototype to prove the concept's business feasibility. More of the market is addressable under new satellite technology; the question is where the price points intersect. A truly dynamic market is not here yet but we can work together to achieve it.

RICHARD H. PELSZYNSKI
Vice President-Marketing & Sales
ASTROLINK™ International Ltd., US

A global Ka-band system is developing. The market drives the technology, but the technology accelerates to stimulate vision in the market. The satellite industry revolution involves the broadening of the available spectrum. When the Ka band opened a year ago, 14 organizations petitioned immediately to be providers. That's exciting, but it's just another enabling technology that has to be tested like the others in the crucible of the marketplace.

The ASTROLINK™ system has filled slots for four of its five orbital positions; a domestic satellite is in the works. One satellite will be launched every four months from now through mid-2001. These will use "popping spot beams" to produce global coverage (through intersatellite links) and high bandwidth, 16 kilobytes minimum. Time delay is a problem that's being worked out.

Terminals for this system will be less than $1,000 each, involving desktop videoconferencing of high quality and full motion. Channels of 384 kbps will be used in distance education and telemedicine. If we can agree on open (and therefore linkable) systems, this network will enable you to dial up instant video on demand. The terminals will be transportable by truck and usable on ships; other bigger terminals and gateway centers will be available for interconnection with existing government or industrial sites.

We could fund the entire world system for less than the cost of one B-2 bomber: $1 billion compared to $2.2 billion. And it would have many defense uses: battlefield information and joint communications operations right now, and in the future there'll be support for operating and maintenance instruction, telemedicine and tailored intelligence gathering (substituting technology for human beings), plus real-time weather data and distance-education in warfare – i.e., war games. This will be an *enabling* technology that allows service for pent-up demands.

DISCUSSION

Boeke: At least 13 US companies are planning to put up similar systems, so there'll be plenty of competition in costs and access.

Talbott: In Washington we're paying $500 to $800 per hour on the C band and $400-$560 on the Ku. But this is a temporary one-year rate, the market was asking $1,000 an hour at one point and we have no idea what it'll be in the future. Costs are THE major challenge of distance education. We have to take programming funds to pay for satellite time, which reduces class time which cuts revenue. A real pinch.

Baranshajme: INTELSAT is our only real choice (in Africa). We are interested in the Project Access program. We hope to see a preferential rate for education uses eventually.

Mattingly: COMSAT supports Project Access because it's the right thing to do, but we want it to provide revenue for INTELSAT eventually. The capacity oversupply of the 1980s meant low rates then, but after 1986 we presold capacity before we launched, so that you are now paying real market prices. You are going to have to band together in a cooperative of some kind and make long-term buying commitments in order to get a bulk rate; you're competing with entertainment and sports buyers.

Educators need more information on who has the capability to deliver what, and what the offerings are.

Ozkul: Turkey will offer media materials, transport and facilities to educators wanting to produce courses related to Turkey. We want to increase our expertise in technical investments, and we want institutions to offer us training and maybe equipment.

What kind of local arrangements are making the African Virtual University happen? Are there lessons for other areas?

Baranshajme: We made sure to use colleges outside the capital cities for our initial links. We're now involved with Zimbabwe, Tanzania, Uganda, Ethiopia and Ghana in the Anglophone sector, and with Senegal, Ivory Coast, Benin, Burkina Faso and Cameroon in the Francophone. One lesson was that interaction with the academic people had to be by fax or telephone, as they didn't have access to free e-mail service.

Audience: Aggregating education customers was tried before and didn't work because each network sought its own best deal. The politics are difficult and the fault lies partly in ourselves. Also, it's notable that the AVU program of science and engineering is male-oriented; programs on nursing, home health care and nutrition would bring more women into the project. How is AVU funded?

Baranshajme: Girls are now very visible in many African schools. Nursing programs would be difficult because the practices are very different among countries, especially in poor areas where there are few hospitals and people make do with what's available. We are starting with science because the belief is widespread that science is not generally approachable by ordinary mortals, and this is a way to erode and fight that idea. We are funded now by the World Bank but only to the self-sustaining stage. We want to avoid dependence on donors and eventually support ourselves on student fees.

Talbott: The four major education providers did combine their hourly demand and the satellite providers did respond, but that was when there wasn't a shortage of capacity and the alliance broke up.

Audience: Eventually we'll have a glut of satellite time with all the projects we've heard about. There are many ad hoc distance education programs out there now; our business could also benefit from international competition. Our weak link is business planning. Even so, corporate priorities are wrong. Education has to be part of corporations' responsibility to the community and governments may have to require it. The profit motive must be balanced with educational needs.

Mattingly: Corporations all pay national, state and local taxes that help pay for education. We are equal partners in that funding pool. As for profit, even your 401(k) plan tries to make a profit. If you have a demand, you have to pay the market price for it. This business is no different than the rest of your education business. Capacity oversupply won't occur for some years, if ever – our early errors won't be repeated.

Audience: The satellite users here are pioneers, but distance education is moving into the mainstream of education. We have to think like the builders of a long-term school system, in terms of bond issues and bricks, not in terms of rented rooms. At the same time we want something more than pay-per-view TV. If a builder wants to put up 10,000 homes, he has to set aside land for schools. The lesson is that we need to amalgamate to press the FCC and Congress and to deal with the companies so as to get straight language from them on their plans and where education fits in.

Pelszynski: ASTROLINK™ hasn't decided yet whether to broker capacity wholesale to franchises worldwide, like the Bells, entrepreneurs, corporations and so on, at certain take-or-pay rates. Service providers then could add their own value and offer programs. About two years before a launch is the time that satellite providers are in the planning stages and are the most receptive to pressure from buyers.

Audience: This all makes a big argument for an education satellite underwritten by US taxpayers and not beholden to corporations. It's significant that no e-rate (education rate) was required by the Telecommunications Act, obviously because of pressure from businesses. We understand the stockholders' point of view, but the time to press for our own satellite is now.

PANEL: COLLABORATION BETWEEN EDUCATION AND INDUSTRY
SARAH C. CAREY, Moderator

HEBE ZUMARAN
Communications Manager
IMPSAT, Argentina

Distance education has 16 years of history in Argentina, but after 1991 the government withdrew support. So a group of universities joined the International Development Bank and the Inter-American Development Bank in a project to link financial organizations, governments, chambers of commerce, banks and universities with some US institutions. Now we have a chance to link this network with content users all over Latin America.

GUILLERMO LOJO
Secretary General
University of Health Sciences School of Medicine, Argentina

Distance education began in the developed world and was exported to less developed nations where only the elite had previously had access to higher education. But much of what came in was not relevant to local needs, where poverty and isolation limit capacities.

Northwestern Argentina has a high illiteracy rate and was targeted by the government for a series of education programs, distance education among them, as part of an effort to keep rural populations from migrating to urban areas that are already crowded. Since 1992, the La Rioja campus has hosted satellite-based videoconferences bringing biotechnology courses from the University of Health Sciences and another Argentine campus. Students and teacher interact during the class with individual communicating devices; this interaction is the main difference of the new system. We are sure satellite distance education will be a principal education tool in the next century in Argentina.

JOHN D. KEMP
President and CEO
Very Special Arts, US

Distance education is wonderful for the disabled. Very Special Arts, founded in 1974 as an affiliate of the John F. Kennedy Center for the Performing Arts here in Washington, provides learning opportunities through the arts for people with disabilities worldwide, especially young people. Access to the equipment, however, is the biggest issue, not just in terms of money but in the human-machine interface.

About nine percent of Americans have a disability that restricts what they can do for a living; distance education might provide lifelong learning for students who could not get it any other way. We now use the World Wide Web to offer videos, for example – great for the homebound or the geographically restricted. Distance ed might increase the isolation of the user, although the disabled are used to that, and the problem is less here than in countries where there is no law similar to our Americans With Disabilities Act.

Does a "culture of disabilities" exist? Distance education could explore this on a worldwide basis. The University of Maryland, New York City and Dublin, Ireland, now have programs aimed at the disabled. Our "Do It" (Distance, Opportunity, Internetworking and Technology) program chooses disabled scholars to receive hardware, software, training, mentoring and at-home computer services for education purposes. Special computer interfaces can overcome various disabilities of vision, speech, hearing and movement. The computer then makes interactive art possible – like a joint Website mural that's being drawn by artists in 14 countries collaborating in real time. A group of writers is building the world's longest sentence.

JOHN DILL
President and CEO
McGraw-Hill Ryerson, Canada

The McGraw Hill University will be an umbrella marketing organization taking our and other publishers' and universities' products to the distance education market. We're based in Canada, which is a vast distance education laboratory of 13 million people spread over five time zones. We have many experts in various partnerships, national and international. One is a consortium called "We Can Learn" – Hubbard College, McGill University and large telephone companies – to deliver low-cost teacher training by late 1997. We are a mainstream supplier but we are not bound to any one technology; our priority is education and cost-efficient delivery of education services. McGraw-Hill wants to be an industry leader.

LAURENCE PETERS
Senior Policy Advisor
Office of Educational Research and Improvement
Department of Education, US

Our Star Schools distance education project maybe one of the most successful education programs we've ever funded. It's an example of a multi-organization consortium set up to serve rural areas, uniting states and universities with public education groups (like the PBS system) to provide programs. After six years, it involves 6,000 schools and has given some instruction to 200,000 students. It also is an in-service professional development service for teachers. Japanese students offer courses in Japanese; Department of Energy laboratories are collaborating with schools on experiments; private sector money has been leveraged in rural areas to increase student achievement. All this on $30 million a year.

Current limits include a lack of video connections from students to teachers. Inner cities are not fully served, and that is a big challenge. We need to provide state of the art technology, especially for professional development and those unmet-need areas.

ROBERT H. T. SMITH
President and Executive Director
Australian Education Office, Australia

Distance education now involves 39 Australian universities. We see education as a tradable commodity. In the mid-1970s, the 37 publicly-supported universities were authorized to offer education courses abroad for fees, so 50,000 Australian students are now taking our courses abroad (of the total 600,000 students at the universities).

Trans-national education of this kind will soon explode. Demand is leaping in less-developed nations, where education exporters are already active. Interactive technology makes it easier and more attractive, and businesses are appearing to provide the capabilities. Stakeholders need a quality assurance system. A "good practices" code would have a very beneficial effect worldwide; perhaps we might begin to form a global alliance for it out of this meeting here.

DISCUSSION

Where is US leadership on the distance education issue?

Peters: The Star School legislation requires that 50 percent of the funding go to rural and underserved areas. The Clinton administration goals include computer training for students and teachers, connections to the Information Superhighway for every school and library, multimedia links and so on. But all the money cannot come from the government; it has to be a partnership and it has to be bipartisan. For example, Congress increased technical education funding; state grants total $200 million.

The programs you've described have specific targets—Australians, Star Schools, Canada, the disabled. How about more general needs?

Dill: We produce materials to adapt to the situation. That's the publisher's role—for example, in making various language versions of a program. Ink on dead trees does still have some relevance.

Smith: We'll work with others, partnering an organization or an institution, but we can't just ship out a program without planning who it's aimed at. A Code of Good Practices being piloted in Asia now by GATE (The Global Alliance of Transnational Education, based in Washington) will address the issue of broad standards.

Zumaran: In Latin America, this is a problem: some material we get just isn't suitable. Much more particular attention and cooperation in design is needed.

Audience: . The National Technological University, based in Fort Collins, CO, is a satellite-based graduate school of education that distributes courses from 47 universities to students who are employees of private companies. They can earn degrees in 13 different subjects using the computers where they work.

- In two weeks, a group of 25 organizations that deliver programs in the health sciences will meet here in Washington. They will discuss ways that Canadian health institutions can develop interlocking education and training practices. This effort will have to unite educators and industry people to work.

- Work done in one place can be like a seed that is transported to grow in a new place. Fragments of a program brought years ago to Turkey are now blossoming in Turkish programs elsewhere.

What about health issues surrounding computer use?

Guy Hammer (from audience): Carpal tunnel syndrome may be on the rise worldwide from computer use, but keyboards may be on their way out. There was concern at the beginning of the computer era about radiation from the cathode ray tube monitors, but it is not gamma (X-ray) radiation. The Defense Department and others are working now to develop flat-panel displays that will eliminate any remaining radiation issue. It's always worth thinking about the health problems technology may create, but technology can also create the solution

LUNCHEON SPEAKER

ELI M. NOAM
Professor of Finance and Economics
Columbia University, New York, US

Revolutionaries may have worn beads and beards in the past but now they look like you: you're overthrowing the traditional university system. Let's assume that the short-term problems of access and cost are solved. What will a world of common distance education look like?

It would be naive to think it will be painless. Universities will be sharing, linked, using the Internet routinely, able to access the world for research data and so on, yes, but the old systems that we have now will disconnect, their financial base and technical base eroded and their role in education displaced.

Universities have three functions: *to do research; to store it for evaluation; and to pass it on by teaching it to others.* Priests of 5,000 years ago were information centers; they wrote things down and became scribes. The material was collected; people came to the collections to read it; and we had formal universities and libraries by the 7th Century BC. This central storage was logical when information was scarce and scholars were few, and it was a stable system for 2,500 years. Now it's breaking down, in slow motion.

- **Research:** Our information supply is doubling every ten to 15 years. For example, the research abstracts of biological science started being collected in 1927 and numbered 1 million by 1937. The latest million accumulated in two years. In chemistry alone, more abstracts were published last year than in *all* the sciences in 1900. Specialization means the research staff must grow too; sheer numbers of people mean the universities are losing their capacity to be broad centers of learning. To study the brain of a leech once was a tiny specialty, but now that would take a generalist. The real specialists interact with other specialists worldwide, on the Internet; the advantage to a university of having a researcher physically present is therefore plummeting.

- **Storage:** Subscribing to one chemical research abstract costs about $12 a year. In 1975 it would have cost $7,000 to subscribe to all of them, and vastly more now. Obviously it's impossible for a university to do that for every field; libraries are shifting to creating electronic *access* to the material, not *storage* of it. A telephone line serves better than a roomful of books.

- **Teaching:** The face-to-face ideal of teacher and learner is succumbing to economic pressures. Reality now is mostly mass lectures in mass universities. Electronic instruction is much cheaper and can reach thousands of students worldwide, bringing electronic courses from textbook companies using prestigious lecturers and solid materials. Educators will find themselves under pressure to reduce duplication among distance learning offerings, and will resist that pressure for the time being.

But tuition rates are high at universities, so private education providers will enter the market for knowledge. Then the question of accreditation becomes important – who controls it? If alternative credentialing of a person's education gains acceptance, universities will lose their monopoly. McGraw-Hill, for example, will be able to compete without any overhead of university buildings, tenured incompetent professors, dormitories and so on, and the great lecturers it hires will make

regular teachers seem pale and dull (in the way *Sesame Street* has challenged and changed kindergarten and elementary instruction). These courses are already coming out, promoted in junk mail.

Perhaps the true university function is as a site for generational transitions, a bonding place for young people. Students could all live in Fort Lauderdale and do distance education there, returning to their home universities for graduation ceremonies.

Most affected by distance education will be the huge mass-lecture universities and professional schools, and disciplines like physics that prize current data but don't require much hands-on training. They could be run by a telecommuting staff, with hotel corporations operating the dormitories, cafeterias and other functions that universities really shouldn't be bothered with.

The question is whether the economic foundation of universities can be sustained in the new era. Research and teaching will still be important, but the cultural value of face-to-face teaching and student presence won't finance it. Mentoring, internalization of data, role modeling, peer groups and so on do require more one-on-one contact, but the people involved don't really have to be present in the same place for those things to happen.

But let's say that's a crucial value, along with credentialing. Then the role of the university might be to hold an orientation session where real people tell the students what exactly they'll have to know to graduate, give them a list of books and courses they might want to take a look at, and tell them to come back when they're ready and take our tests. The students could pick the kind and the politics of their own instruction, while the universities would provide the criteria for achievement and some guidance.

This won't happen overnight, obviously, but do not doubt that it is coming. In the future, information will go to people wherever they are. Will the new electronics destroy universities as institutions? What we need are innovators for the *old* institutions; the future can't be held back forever.

PANEL: THE IMPACT of CHANGING INTERNATIONAL and NATIONAL POLICIES on DISTANCE EDUCATION
HONORABLE JOHN H. BUCHANAN JR., Moderator

CORINNE McKNIGHT
Ambassador
Trinidad and Tobago

The majority of the Third World already has some form of connection to the Global Information Infrastructure, but we are not sure yet how existing international policies affect us. Among the policies we would like to see, however, are the following:

- Universal agreement that universal access is necessary for the world development that everyone says is wanted.
- Government commitment to develop qualified people to operate this new system.

National policies would then require defining the *national* infrastructure to ensure true universal access. Now the focus is on connecting only businesses and universities. These policies must be evaluated for the changes needed to profit from the technological era – to produce qualified people, foster competition and offer incentives to the private sector to develop the technology.

Intensive capital resources will be required. This means regional and/or international organizations of cooperation and coordination. INTELSAT and similar bodies have a critical role in producing standards for interoperability, the sharing of the spectrum and so on.

We see a future problem of excess satellite capacity. Perhaps a division of INTELSAT could be authorized to redistribute this capacity among countries on the basis of need, as outer space belongs to no one and what goes out there must benefit all humanity, after a fair return to investors. Business could build 5 to 10 percent for the general good into their bottom lines from the beginning of each project and avoid future debate of this kind.

TOM KALIL
Senior Director
National Economic Council
The White House, US

President Clinton's Education Initiative has four goals: to connect all classrooms to the Internet; to increase the number of multimedia computers in classes; to improve teachers' ability to use the new technology; and to improve the educational software needed to use the Global Information Infrastructure.

Sixty percent of all jobs in 2000 will require a working knowledge of computers. Teamwork, judgment ability and lifelong learning are all enhanced by them; all workers will be making more on-the-job decisions as the distinction breaks down between managers who *think* and workers who *do*. Teaching has been an isolated profession, but now teachers are on line with their peers, exchanging lesson plans and ideas. Students meanwhile are exploring new libraries, documents and databases on line, and they are able to do real-time comparisons of news media coverage of major events.

This means more specialization and more capacity to model behavior (in conflict, trade, cultural transmission and epidemiology), which will allow students to have a cross-disciplinary understanding of these complicated interactions.

In the new Telecommunications Act, the Snowe-Rockefeller provision gives special consideration to schools and libraries. It also increases competition among telecommunications companies across previously segregatated markets in order to lower prices and increase services. The industry is persuaded that they have an enlightened self-interest in getting their technology into the schools; they will have to hire from among these young people eventually.

A Technical Literacy Challenge Fund has $200 million for states and localities to use in fiscal 1997 to address four basic needs: computers, connectivity, content and communications. Other programs include the 21st Century Teachers who train their colleagues, and a technical corps of engineers who go into schools to help them get set up. Satellite companies can be relied on for help too when large downloads are needed from one click of the mouse. Cooperation is needed to get all of this up and running.

SIDNEY PIKE
President
CNN International Special Projects, US

The lack of private sector cooperation in providing capacity to educational institutions is an issue Mr. Kalil should address.

Kalil: Our approach has been to increase the purchasing power of the end users and let them buy what they want. Price for performance is getting dramatically better; current technology will soon allow the Encyclopedia Britannica to be transmitted in one second over a single strand of fiber.

Pike: That's tomorrow. What about today? The world is in big educational trouble and there is no technology to take care of the need. A satellite for the exclusive use of educational transmissions would take care of the children worldwide.

Audience: Such a satellite was launched in the 1970s, but without any public funding for distance education program production. Current talk about the Global Information Infrastructure and the Superhighway never mentions a satellite either.

Kalil: It's an idea worth discussing.

Pike: I spent 25 years at CNN and eight, from 1984 to 1992, distributing the service worldwide. I set signing up Saddam Hussein as my personal goal. One day an arms dealer said he could arrange a dinner but it would cost me $400,000. Instead, I went to Iraq and made a pitch to the Minister of Information and some TV people, and left. When the Gulf War started some months later, Iraq TV called my office ("My secretary said, 'You won't believe this, but ...' "), and two minutes later Saddam Hussein was on CNN.

They had kept my card. The next day he called me again, although I'd explained how to reach the newsroom directly – they had my card and I was their personal contact.

Later on, Moammar Khaddafi did the same thing – he'd gotten the reference from Saddam Hussein.

The overpopulation issue worldwide will lead to a crisis of everything sooner rather than later. The universal answer is going to be an education satellite that can enable all of us to intercommunicate and understand one another to keep tensions low. The business and entertainment industries should not be the ones to drive distance education in the future. Governments should take responsibility: if they increase spending for education they'll be able to decrease spending for defense.

Today I had the chance to attend the World Series baseball game in Atlanta, but I came here instead, because that's just baseball and this will have a real and permanent effect. This Summit is the true World Series.

WILLIAM T. McCAUGHAN
Vice Provost & Executive Director for Extended Learning
Texas Tech University, US

Educators usually find out about government regulations and policies that affect us after they hit us. The Telecommunications Act had the Snowe-Rockefeller amendment for libraries and schools added, yes, but it was at the very last minute. We have got to be more involved in the national education policy debate.

For example, the way FCC rules are drawn up for implementing this act will have a major impact on other countries. A huge volume of data will be going out, adding to the pressure on them of our increased weight in the world, and the chance to make that impact educational and not just entertaining should not be lost. At the state level, public utility commissioners will play an important role and need to be contacted as well.

For example, the Texas legislature passed a telecommunications deregulation bill before the national measure passed, but the Texas version created a tier of educational, library and medical users who got special rates. The price dropped from $2,100 to $260 per month for one medical circuit. A special Telecommunications Infrastructure Fund, generated by a small tax on private sector profits (in exchange for deregulation) produced $1.54 million for the educational sector of the state. That's not huge, but it's big, and it arose from our involvement in the process.

The ITU is now wrestling globally with policies like this. The old PTT (post, telephone and telegraph) services are finally being separated in many countries, monopolies breaking up as new technology and regulations come in. Satellite technology means that private firms can address specific needs in competition with the state-owned units too. New issues involve intellectual copyrights, property rights of writers and content producers, and guarantees of protection for investments before big money can come into the less developed nations. LEOs will reduce the ability of nations to control what is broadcast to their people; without the ITU or some other international agreements, differences of politics, religion, culture and so on will cause a lot of hard feeling. We in this business ought to be on the front end helping shape those policies or we will suffer later on.

RAY PATTEN
Managing Director
ACORN/SAT Ltd., Ireland

Ireland is a small place, but well-educated. Satellites are bringing us the training and financial services we need and exporting our education capacities to the less-developed countries. As our Minister of Science, Commerce and Technology wrote to the Summit, we are open to cooperation with the world and sharing with all nations, particularly in Africa. Satellites have a central role in providing connections.

The pillars of Irish development have been major investments in both the education system and in telecommunications systems. This marriage will contribute to our own future and that of the less developed nations. A driving force is the European Union, a kind of government-in-waiting, which is working on standardization, cooperative operations and funding for telecommunications technology. We are in a constant search for partners eager to cooperate with European companies.

To stimulate cooperation across conflict lines in Ireland, the US Congress and other bodies created an International Fund for Ireland, for use in joint ventures. In Africa, however, monopoly revenues may be the only possible source for an investment pool big enough to improve the national infrastructures. Breaking up the PTTs there might make a bad situation worse.

DISCUSSION

Audience (a Hughes Communications representative): Satellite space is sold both on a full-time (or "rental") basis and a part-time ("hotel") basis. We've encouraged cable operators to join in one satellite "neighborhood" that cuts our costs, and educators could do that too, but they haven't. Education programs are now spread all over the four satellites in our fleet.

McCaughan: We learned that $165,000 per month recovered costs for our transponder owner, but they raised their price to us from $565 per hour to $1,000 per hour. Figuring the math, conservative use of 15 hours per week across four time zones, four days a week, $565 per hour, gave them $165,000 per month plus an additional $4 million profit per year. So why the additional charge? When we started looking at digital, we got a huge range of price quotes. The economics of getting a bird up keep going down, but my costs keep going up.

Pike: You're being too passive. The squeaky wheel gets the grease in this world. Parents can be mobilized to make some noise, and Congress and the president *respond* to that kind of noise. The key is to get organized.

Audience (a New Mexico tribal leader): Leaders are supposed to address the general welfare. Don't get too artificial and commercialized with education offerings. The image of the Bahamas can't compare with the reality of going there. People have to participate in the learning process. Navajos said they had been on the moon already and knew before the US space effort that space travelers have to come back to earth at a different angle or risk missing the planet altogether. Like that we must draw connections between real human experience and cultural tradition and the new technology so as not to lose the spiritual element of life. Remember that Native Americans are a less-developed country within the US.

Audience: Let's endorse a resolution and recommendation to President Clinton that he find some Defense Department money to set up a satellite for the exclusive use of education.

Buchanan: The motion clearly carries.

John A. Champagne, COMSAT: Virginia agreed with COMSAT to a major time purchase and their price was $220 per hour in 1995, $195 this year and $175 next year. If you content providers can commit to a long term arrangement of several hundred hours, we can package around your problems and your year-to-year funding and your problems with state legislature appropriations. We *can* bring the rates down. Satellites are not regulated and that will allow us to arrange a win-win situation for everybody.

Pike: That's not the general case. Our own satellite will be the best way; the prices we pay will cover operating costs.

Hughes representative: Just as in running a hotel, moving people in and out constantly for short-term use raises costs enormously, and you don't get full usage. Fifteen hours a week is not "conservative" use but rather full – we see seven hours or so instead and have to charge accordingly to cover our costs.

Audience: Education is not just another commodity. We hear "get together" and "learn to lobby," but education people are beholden to *local* governments. If children are the commodity here, we can't approach the issue from traditional business models.

WRAP-UP

SHELLY WEINSTEIN

These two days have been a beginning and not an isolated event. We have had a unique opportunity to raise our level of awareness and learn more about how to take advantage of the resources available to us. Public and private sectors now must look for models that will respond to the complex issues we have reviewed in order to encourage competition and protect the public interest at the same time, and we must seek ways of paying for it all.

The Global Summit has demonstrated the enormous potential in distance education as well as the barriers facing it. Demand is great and technology is abundant, but the technology may not be affordable or available where it is most needed. Today we have no global education and training network, no aggregation of resources, and no strong sense yet among commercial providers that distance education is an economically viable market. The telecommunications field has not yet recognized that it is now a transportation industry, carrying education, training, instruction and all the elements of the information economy to where the users are—in classrooms and workplaces worldwide.

The fundamental question of the Summit is this: what must be done so that distance education begins to fulfill its potential?

One piece of a possible answer has come from INTELSAT, which has donated satellite capacity and technical training seminars for one year for a pilot project of distance education for the Americas. Other companies have offered similar limited projects. But are these donations the answer to developing long-term, sustainable, public-private partnerships for education and training networks on a worldwide basis?

Tell us what you think. Fill out the questionnaire in your information kits. Tell us your view of the INTELSAT demonstration project, "Education and Training Network for the Americas." Would you take part in a working group to develop technical and policy criteria for a long-term global network? Let us know. Send us your ideas, your recommendations. We want to hear from you about the demand for education and training that is driving the future of the world.

Thank you for your participation.

III. Appendix A

Global Communications Workshop
ROUNDTABLE DISCUSSION

CYNTHIA BOEKE
Editor, *Via Satellite* Magazine
ROUNDTABLE DISCUSSION

Growth and change are the key words in today's satellite industry. By 2000, $54.35 *billion* worth will be orbiting: $28 billion in new, non-Ka band commercial geostationaries; $10 billion in big Low-Earth Orbiters (LEOs); $350 million in little LEOs; and $16 billion in Ka-band systems (LEO and GEO).

Looking at Western-built commercial satellites (excluding military, weather and scientific ones), 162 are orbiting now and 77 are on order and under construction. Since the first launch in 1953, the growth rate has been astonishing: from 13 satellites in the decade of the 1960s (or 1.3 per year) to 130 in the first six years of the 1990s (22 per year). By the end of this decade we'll have 280 in orbit. In fact, this ten years could see the launching of 70 percent of all the satellites in existence. And that won't meet the current demand for capacity.

In 1960 there were two satellite operating companies; now there are 49 – a doubling since 1980 – and we'll have 70 by the new millennium. The industry is getting very competitive and beginning to consolidate; US operators are going global and creating private fleets that will soon rival INTELSAT in size and capability, especially as INTELSAT privatizes and moves to reduce the size of its own fleet. American manufacturers have produced 75 percent of the world's geostationary orbiters, and Europe 25 percent, mainly consolidating under French leadership.

Today in orbit the world has 3,285 transponders: 1,801 C-band (55 percent); 1,323 FSS Ku-band (40 percent); and 161 BSS Ku-band (5 percent). That's a total of 155,843 MHz. Another 2,003 transponders (on 77 satellites) are on order, and the growth here is most notable in the BSS-Ku band – 17 percent of the total new orders.

Looking at this capacity by region:

- **North America** has 39 satellites (with 931 transponders) up now, or 24 percent of the total, and 11 satellites (with 434 transponders) on order, 14 percent of the total. Most of this is being set up for non-educational purposes, and a regional North-South American market is developing. It's all dominated by US players, especially Hughes and GE American, although Loral/AT&T/Cyberstar and Echostar are new players with global aspirations.

- **Asia-Pacific** has 35 satellites (21 percent of the total) with 582 transponders, and has ordered another 25 satellites with 568 transponders – 32 percent of the world's new orders, the most of any region. Japanese operators, with the second largest number of domestic satellites, are going international with Superbird and JSat; this is a rapidly growing and competitive market.

- **Europe** has 28 satellites up (348 transponders), 17 percent of the world total, and 16 on order (363 transponders, 21 percent of new orders). This is a mature market dominated by DBS and DTH applications, offering the world's highest prices for capacity.

- **Latin America** has eight satellites (178 transponders, the majority C-band) and has ordered another five, with 98 transponders. DBS is about to take off there. Regional coverage is supplemented by strong regional capacity from INTELSAT and PanAmSat.

- **Mideast** satellites total seven now, with 83 transponders, and another three are on order, with 58 transponders. Also served by INTELSAT and PanAm Sat, this region is seeing an influx of Ku-band capacity and new players (Israel's Amos, the NileSat and ArabSat), and it is a growing market for DTH/DBS.

- **Africa** has no dedicated satellites so far and has ordered one DAB unit, but PanAmSat brings the Ku-band in and the region has strong ties to INTELSAT. It will be the first market for direct-to-consumer digital audio broadcasting satellite service, from Worldspace.

- **Trans-Oceanic** satellites include Inmarsat, INTELSAT, PanAmSat and others; 24 are now orbiting over the Atlantic and 9 over the Pacific, with another seven and five on order, respectively. Eleven are orbiting over the Indian Ocean and another four are on order there. Because of increasing competition from fiber-optics for point-to-point telephony trunk lines, however, there's a movement toward fewer trans-oceanic satellites.

In general, video is the driving force in the satellite industry. The US dominates the market both in manufacturing and in new technology. The biggest growth area is telephony services direct to user. As INTELSAT privatizes, we'll see a blurring of domestic, regional and trans-oceanic service, adoption of digital technology everywhere and a growing interest from Wall Street. So many satellites will mean more crowding in the orbital slots.

Distance education trends include continued high prices for satellite time. The US has been the major market, but that growth has been halted by the filling of formerly excess capacity, which led to a doubling and tripling of prices. US operators have been consolidating, creating huge global fleets, but they want full-time users and those are entertainment providers, not universities. If users could aggregate themselves to increase their buying clout they could force some competition for their business, but that won't happen soon. In the meantime, demand for distance education is rising globally as educators become aware of how well it could work in remote and poor areas, but the only places it's actually occurring are in state-funded distance education initiatives that can use government-run satellites. That's not happening in the US. The days of donated capacity are waning fast.

IV. Appendix B

Global Summit on Distance Education
PROGRAM

Wednesday, 23 October 1996

8:00 - 8:30 am Registration

Continental Breakfast

8:30 - 9:00 am Irving Goldstein, Director General & CEO, INTELSAT - Astrain Room

Welcoming Remarks

9:00 - 10:30 am ***"The Role Of The Private Sector In Distance Education"*** - Astrain Room

MODERATOR *Honorable John H. Buchanan, Jr.*

PANELISTS Jerald F. Farrell, President, Hughes Communications, US

Hon. Tony Coelho, Chairman and CEO, ETC w/tci, US

Barry Inouye, Director, International Programs, CODETEL, Dominican Republic

Renato Goodfellow, Head of Satellite Service Initiatives, Britsh Telecom, UK

Ellwood R. Kerkeslager, VP, Technology and Infrastructure, AT&T, US

Hon. George E. Brown, Jr., US House of Representatives , California (via satellite)

10:30 - 10:45 am Break

10:45 - 12:15 pm ***"The Role Of Government In Distance Education"*** - Astrain Room

MODERATOR *Honorable John H. Buchanan, Jr.*

PANELISTS Ambassador Stuart E. Eizenstat, Under Secretary of Commerce for International Trade, Department of Commerce, US

Peter McMechan, Director, Commonwealth of Learning, Vancouver, BC, Canada

Joseph D. Rodota, Jr., Deputy Chief of Staff, Office of Governor Pete Wilson, California, US

Barry Epstein, Congressional Fellow, Office of Senator John D.Rockefeller, IV, US

Luis Sanzgadea, Sr. Officer, Spanish Ministry of Development, Spain

12:30 - 1:30 pm Luncheon - International Lobby

1:30 - 2:00 pm Introduction - Irving Goldstein

SPEAKER *Honorable Reed Hundt*, Chairman, US Federal Communications Commission

Wednesday - 23 October 1996

2:00 - 3:30 pm ***"Education, Training & Technology"*** - Astrain Room

MODERATOR *Jay Sanders, MD*

PANELISTS Dr. Smith Holt, Dean, College of Arts & Sciences, Oklahoma State University, US

Dr. Allen Lee Sessoms, President, Queens College, US

Dr. Menahem Yaari, President, Open University of Israel

Dr. Jose Conrado Benitez, President, The Philippine Women's University, Philippines

Dr. Mary Hatwood Futrell, President, Education International, Belgium, and Dean, School of Education and Human Developement, George Washington University, US

3:30 - 3:45 pm Break

3:45 - 5:15 pm ***"New Technologies Workshop - Transfers & Applications"*** - Astrain Room

PRESIDING *Dr. John Stevenson*

PANELISTS Zvika Klier, General Manager, Arel Comm's. & Software, Ltd., Israel

Guy Hammer, Director, Office of Technical Applications, BMDO/DOD, US

Michael R. Kerouac, Senior VP, Multimedia Medical Systems, US

John A. Champagne, Director, Office of Broadcast Systems, COMSAT-RSI, US

Barry H. Whalen, Consutant, Nat'l. Technology Transfer Center, US

5:15 - 6:00 pm ***"Global Communications Workshop - Current Trends & Future Prospects"***

PRESIDING *Cynthia Boeke*

Round Table Discussion

6:00 - 7:00 pm Reception

7:00 - 9:00 pm Dinner - International Lobby

Acknowledgements

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Mitchell Technical Institute / MTI Telecom Systems

Telemation/Los Angeles

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Thursday - 24 October 1996

8:15 - 8:45 am Registration
Continental Breakfast

8:45 - 9:00 am Shelly Weinstein, Pres. & CEO, Nat'l. Education Telecomm. Org. & EDSAT Institute (NETO/EDSAT), US - Astrain Room
Opening Remarks

9:00 - 10:30 am ***"The Experience of Distance Education Providers"*** - Astrain Room
MODERATOR Cynthia Boeke
PANELISTS Dr. Brian L. Talbott, Superintendent, Educational Service District 101, Washington, US
Richard Pelszynski, VP., Astrolink™ International, Ltd., US
Dr. Ekrem Ozkul, Ass't. Dean, Anadolu University, Turkey
John H. Mattingly, VP and General Manager, COMSAT World Systems, US
Etienne Baranshajme, World Bank, African Virtual University Project, Sub-Saharan Africa

10:30 - 10:45 am Break

10:45 - 12:15 pm ***"Collaboration Between Education and Industry"*** - Astrain Room
MODERATOR Sarah C. Carey, Esq.
PANELISTS Guillermo Lojo, Secretary General, University Institute of Health Sciences, School of Medicine, Argentina
John D. Kemp, President and CEO, Very Special Arts, US
John Dill, President and CEO, Mc-Graw Hill Ryerson, Canada
Laurence Peters, Senior Policy Advisor to Assistant Secretary OERI, US Department of Education, US
Robert H.T. Smith, President and Executive Director, Australian Education Office, Australia
Hebe Zumaran, Communications Manager, IMPSAT, Argentina

12:30 - 1:30 pm Luncheon - International Lobby

1:30 - 2:00 pm Introduction - Donald D.Wear, Jr., Esq.
SPEAKER *Prof. Eli M. Noam*, Columbia Institute for Tele-Information, US

2:00 - 3:30 pm ***"Impact Of Changing International and National Policies on Distance Education"*** Astrain Room
MODERATOR Hon. John H. Buchanan, Jr.
PANELISTS Corinne McKnight, Ambassador, Trinidad and Tobago
Tom Kalil, Sr. Dir., National Economic Council, White House, US
Sidney Pike, President, CNN International Special Projects, CNN International, US
Dr. Wm T. McCaughan, Vice Provost, Texas Tech University, US
Ray Patten, Managing Director ACORN/SAT Ltd., Ireland

3:30 - 4:00 pm Wrap-up - Shelly Weinstein

4:00 pm Reception

Honorable Larry Pressler - Remarks

LARRY PRESSLER, SOUTH DAKOTA, CHAIRMAN
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United States Senate
COMMITTEE ON COMMERCE, SCIENCE,
AND TRANSPORTATION
WASHINGTON, DC 20510-6125

The Honorable Larry Pressler
United States Senate
South Dakota

Senator Pressler's Remarks as presented
by former Congressman John H. Buchanan, Jr.
at the "Global Summit on Distance Education"
October 23, 1996

I want to congratulate you all for participating in this important event. I regret that I am unable to be there in person and participate in the important discussions that will be taking place. I would like to thank the sponsors of the group: INTELSAT, NETO/EDSAT, COMSAT, Arel Communications & Software Ltd. of Israel, Astrolink International, Ltd., AT&T SKYNET Satellite Services, Hughes Communications, Inc., National Technology Transfer Center - Washington Office, Washington International Teleport, Mitchell Technical Institute and Telemation/Los Angeles.

Back in July, Irv Goldstein and I announced our intentions to work together to launch a pilot program that would provide free use of one of INTELSAT's satellites for education, telemedicine and other applications both here in the United Sates and around the world. I am pleased to see that the interest in distance education has brought others in to participate in similar projects. It is my honor to be so closely involved in the next step forward toward realizing the potential of such programs.

In America, and all across the world, there is an increasing need for communications technology in our schools, hospitals and businesses. Satellites and other technologies can provide the necessary communications between urban and rural areas, such as in my state of South Dakota. They can provide the same service for international communications. These technologies and applications will bring us all closer to providing the essential training and education necessary to improve the lives of our children and our working families.

I know this Summit will be a great success. I look forward to reading the report that comes out of the conference, and to working with you to realize the true potential of this endeavor.

Global Summit on Distance Education - Press Release

FOR IMMEDIATE RELEASE

Contact: Melinda Machado
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Experts Convene in Washington to Chart Future Direction of Global Education & Training Networks

Washington, D.C., 23 October 1996 — The Global Summit on Distance Education organizers today announced the successful beginning of a two-day, worldwide conference to raise awareness and visibility for the immediate need to establish education and training networks on a global basis. "Worldwide demand for education and training is growing exponentially much the same as the demand for news grew in the 70s and 80s," said Sidney Pike, President of CNN International Special Projects, and Director of the National Education Telecommunications Organization.

In the 21st century, schooling, jobs, professional training, and social services must be available through new communications technologies—regardless of distance or wealth—as technological advances continue to revolutionize access to information around the globe. Students and workers will need life-long opportunities for education and training to help them cope with demands in changing workplaces and culturally diverse societies.

Educators, business and government representatives from six continents have gathered in Washington, D.C. at the INTELSAT building, 3400 International Drive NW, to discuss their roles in providing global connections between cultural institutions, telecommunication organizations and individuals.

"Distance Education is an issue that goes to the core of INTELSAT's founding principles—that is how to provide advanced telecommunications to all countries in the world for peaceful purposes," said Irving Goldstein, Director General and CEO of INTELSAT, one of the many sponsors of the Global Summit.

Sponsors of the Summit include: Arel Communications & Software Ltd., of Israel, Astrolink™ International Ltd., AT&T SKYNET® Satellite Services, COMSAT World Systems, Inc., Hughes Communications, Inc., INTELSAT, Mitchell Technical Institute, National Education Telecommunications Organization & EDSAT Institute (NETO/EDSAT), National Technology Transfer Center - Washington Office, and Washington International Teleport (WIT).

- more -

The overflow crowd of attendees at the Summit are addressing issues of equity, the viability of investing in the requisite infrastructure, how to protect the public's interest in education, economic and social well-being with affordable access and useful services, and the impact of changing international and national policies on distance education.

Many of the companies and institutions represented at the Global Summit have experienced similar problems in distance education in terms of equity, high cost, barriers to access for teachers and students, lack of training, and fluctuating supply and demand, which all combine to leave educators and corporations with unpredictable services.

Senior government officials, university presidents, deans, corporate CEOs, teachers and faculty from as diverse countries and regions as South Africa, the Philippines, Morocco, Europe, Central & South America, Australia, Iceland, Trinidad & Tobago, Canada and the United States are working together at the Summit to explore historical, technical and policy issues, and future plans to deliver and use distance education to far-flung rural and big city sites.

A Global Summit on Distance Education Advisory Committee has served to guide planning for the gathering. Its members include: Honorable Larry Pressler, Honorable Conrad Burns, Honorable John D. Rockefeller IV, Honorable George E. Brown, Jr., Honorable Constance A. Morella, George Washington University, International Medical Programs, Inc., Oklahoma State University, Texas Tech University, University of South Dakota, University of Virginia Health Sciences Center, American Educational Research Association (AERA), Society of Satellite Professionals International (SSPI).

- end -

Questionnaire

GLOBAL SUMMIT ON DISTANCE EDUCATION
PARTICIPANT RESPONSE FORM
October 24 - 4:00 P.M.

NOTE: The Wrap Up for the Global Summit on Distance Education (GSDE) will review and discuss the following questionnaire. Following the Summit we hope you will take the time to respond to the following questions and send your answers to the address listed below. Thank you.

Questionnaire

1) Are you or your organization interested in participating in a Working Group to help design and shape global education and training networks?

2) What are your or your organization's interests in participating on a "Global Summit on Distance Education" Working Group, i.e., infrastructure, content, governance, finance, end-user tools, software & content?

3) Please explain what special role or "element" of a global education and training network your organization plans if any, to bring to a demonstration "Education & Training Network of the Americas".

4) What other options do you propose in place of Global Education and Training Networks to meet expanding demand for education and training networks?

5) Other information or thoughts which you would like to share about your organization's plans for Distance Education.

Thank you for your interest and participation.

Please Respond To: Global Summit on Distance Education
INTELSAT Building
3400 International Drive, NW
Suite 7E-13
Washington, DC 20008-3098
FAX: +1 202-944-7757

Quotes

"...among policies we would like to see.....Universal agreement that universal access is necessary for the world development that everyone says is wanted..."

Her Excellency, Corinne McKnight
Ambassador, Trinidad and Tobago

"The government role is to ensure that the Global Information Infrastructure (GII) eliminates distance as a barrier to education, and to make the US a world leader in the business of education."

Ambassador Stuart E. Eizenstat
Under Secretary of Commerce for International Trade
US Department of Commerce

"...You need to muster facts: K-12 is a $150 billion business....If you speak with one vote on what you need and what you will pay for it, you can take advantage of the telecommunications law and force the industry to compete for your business, driving costs down."...(commenting on the distance education community)

Barry H. Whalen, Consultant
US National Technology Transfer Center

"Finding the lowest-level solutions that will work may broaden the have/have-not gap: computer hardware may be available but an area without electricity can't use it...The government role must be to create the climate where private investment can make distance education happen."

Peter McMechan, Director
Commonwealth of Learning, Vancouver, B.C., Canada

"As we fail to act, kids keep growing up and passing through the system. A Harvard University study of a fourth grade class recently concluded that with distance learning, all the good things go up – attendance, grades, participation – and the bad things go down, like boredom. But those target kids go on to other grades without distance education."

Honorable Reed E. Hundt, Chairman
US Federal Communications Commission

"I wish to thank you for the opportunity you have given me to participate in the most exciting and important conference of the 20th century, the Global Summit on Distance Education. As we face the challenges of the 21st century, nothing can be more critical than preparing ourselves to deal with them."

Youn-Cha Shin Chey, Ph.D.
President, Intercultural Institute of California

Global Summit On
DISTANCE EDUCATION
Education and Training Driving the Future